nexstep NATIONAL PLATFORM FOR RE-USE & DECOMMISSIONING

Re-use & Decommissioning hand-out

On the Road

2021

Preface: Jacqueline Vaessen

General Manager Nexstep

"We are moving in the right direction, and we are making good progress"

We are facing an immense challenge. Over the past decades, the infrastructure for the production and transportation of oil and gas in the Netherlands has expanded considerably. However, a large fraction of the oil and gas fields is approaching the end of its economic life.

This hand-out provides insight into the oil and gas infrastructure that is forecasted to be decommissioned in the Netherlands over the coming ten years and covers what has been decommissioned so far. Nexstep facilitates, stimulates and illustrates the re-use and decommissioning of oil and gas infrastructure in the Netherlands. The total cost of decommissioning the infrastructure was estimated at 7 billion euro in 2017; Nexstep's aim is to reduce these costs by 30%. The "Road to 30%" is our strategic program to reach that goal.

The title of this hand-out is "On the Road", with a nod to our "Road to 30%", but it also expresses that we are on the road to reach our aim of reducing decommissioning costs by 30%. As usual in innovative programs our Road to 30% is not the highway to success, but a winding road with unexpected obstacles. Being an optimist by nature, I am happy to share that we are moving in the right direction, and we are making good progress.

In last year's report, Nexstep's team leads described the content of the Road to 30% program. This year, we will update you on how we are progressing on the roadmaps.

I read the contribution of the Young Energy Officers in this year's report with great enthusiasm. The comments of our young and bright ambassadors evoked the following statement: "Without the resource and know-how of the industry, some technologies like CCUS and low-carbon hydrogen may not reach maturity, making energy transitions more difficult and expensive."
Fatih Birol, director International Energy agency, Energy Transition Conference 2020.

Nexstep also focuses on repurposing oil and gas infrastructure to accelerate the energy transition, looking exactly at the technologies Birol was referring to, which is very important to attract the younger generation.

In this year's report, we included interviews with several operators in the Netherlands, focusing on decommissioning, on re-use and on the importance of producing gas from the North Sea. Times are changing, and we are seeing more interest for all three subjects, especially in Parliament, as demonstrated during the debate around the changes of the Mining Act last December. I was, of course, very proud that Nexstep was mentioned by several members of Parliament, but the biggest achievement is that there is awareness of the importance of Dutch natural gas, the opportunities for repurposing the oil and gas infrastructure and that the industry has been taking their responsibility in decommissioning infrastructure. Compared to last year's report, there have been some changes in the forecasted decommissioning activity. Due to COVID-19, the historically low gas price and the issues around nitrogen deposition in the Netherlands, forecasted decommissioning of last year has been postponed.

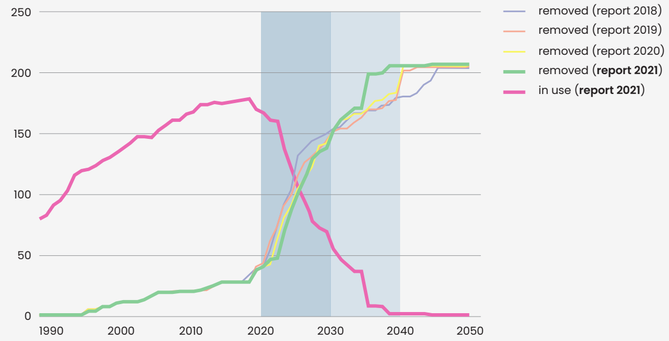
I would like to refer to our fourth Re-use and Decommissioning report, which can be found at www.nexstep.nl

Key figures

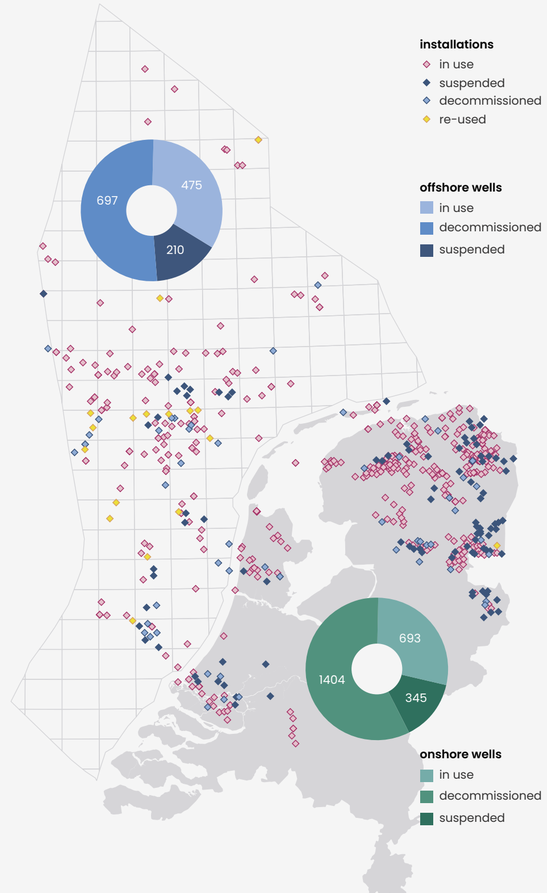
The figure below shows how many offshore installations have been removed, and when the remainder is expected to be decommissioned. Last year, the offshore decommissioning activity was forecasted to be very low for 2021. The expected higher activity level forecasted in last year's report for 2022 however, is now being postponed to 2023.

Overall, when the forecasted decommissioning schedules of the 2018, 2019, 2020 and 2021 reports are compared, we see that the forecasted decommissioning has been delayed each year. Schedules are set up well in advance, which means that the window of operations can shift. Whether the timeframe can be met depends on several factors, and those factors could be different per offshore installation.

Number of offshore installations



The map below presents an overview of the oil and gas infrastructure in the Netherlands. Today, more installations are in use than have been decommissioned. On the other hand, more wells have been decommissioned than are currently operational and suspended.



A perspective: Lidewijde Ongering

Secretary General of the Ministry of Economic Affairs and Climate Policy

"The first to jointly remove infrastructure with so many operators"

As of September 1, 2020, Lidewijde Ongering has been the Secretary General of the Ministry of Economic Affairs and Climate Policy. In this interview we ask her how she looks at the past and the future of the oil and gas industry.

You are new to the Ministry, how did you become aware of Nexstep?
"I learned about the work of Nexstep when we were discussing the changes to the Mining Act regarding the decommissioning and re-use of oil and gas infrastructure. That's when I also realised that there were connections with my previous department, being the Ministry of Infrastructure and Water Management, with regards to pipelines offshore."

What surprised you most about Nexstep?
"Although Nexstep is a relatively new organisation, the company is already well known for its approach and objectives with regard to re-use and decommissioning of oil and gas infrastructure. People are aware of Nexstep's aim to reduce the costs of decommissioning, which is important for the Dutch taxpayer, but also of its focus on repurposing oil and gas infrastructure to accelerate the energy transition. That is something Nexstep can be proud of. Since it was only a few years ago that there was hardly any thought about whether the oil and gas infrastructure could be repurposed."

In February 2021, the tender for the first joint campaign to decommission wells was issued to the market. What are your views on the joint campaign?
"Although the Netherlands is a small country, we might be the first to jointly remove infrastructure with so many operators. Indeed, there are still many hurdles to overcome, but it is a breakthrough that the industry has taken this step. Hats off to all the partners that make this possible. We continue to follow these developments with great interest. After all, the Ministry of Economic Affairs and Climate Policy also stands for the proper functioning of the market and the associated procurement rules."

Nexstep asks attention for "Mind the gap", where infrastructure is planned to be removed before there is a possibility for re-use. What is your view on that?
"We see the importance of repurposing existing infrastructure. This can accelerate the energy transition and reduce additional investments. The amended Mining Act makes it possible to repurpose infrastructure to accelerate the energy transition. It is important that we get an overview of which infrastructure can be repurposed as soon as possible. The first examples are already emerging. The Porthos project for CO_2 storage in an empty gas field is progressing steadily, and the first green hydrogen production pilot will also start this year. These are important steps towards a CO_2-neutral energy system, and I look forward to the results. And what we cannot repurpose must, of course, be decommissioned safely and efficiently."

How do you see the future of the gas industry?
"Natural gas production will remain important for the Netherlands in the coming decades, in order to meet the Dutch energy demand. Dutch natural gas provides security of supply, jobs, economic value, and it produces much less CO_2 emissions than imported gas. This means that we must ensure that the sector remains attractive to young people. We must maintain the knowledge and skills of the subsurface in our country. Not only for gas extraction, but also for the energy transition. This knowledge and expertise are essential for CCS, geothermal energy and offshore hydrogen production and storage."

What advice would you like to give to Nexstep?
"As stated earlier, there is a need to gain insight into how existing infrastructure can contribute to the energy transition. Nexstep could play an important role in this. I look forward to hearing more about Nexstep's plans and seeing Nexstep continue to share this subject with a wider audience."

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Today

Operators are typically being associated with exploration and production activities for oil and gas. However, decommissioning of the assets following the production phase is also part of the total life cycle and as such of the operators' core business. Decommissioning is happening as we speak. NAM is currently decommissioning a significant number of wells onshore with a dedicated Plugging & Abandonment (P&A) unit.

Excerpt of interview with

Johan Atema
CEO
NAM

The aim of the project was to decommission 70 wells in three years' time. What is the progress of this project?
"I am very pleased that we are on the right track. At the moment, we have already decommissioned 22 wells. Our ambition is indeed to decommission those 70 wells, and I expect that we will achieve this within the agreed term. So, we had a very good start. The P&A unit places several cement plugs at various depths in a well. The well is safely and permanently closed this way. This decommissioning tower takes up less location space than for example the Synergy rig which we had under contract until recently. Due to the modular container construction, the tower can be quickly transported to new locations. The tower can be taken apart and rebuilt within 48 hours; with the Synergy rig this took seven days. The decommissioning tower is only suitable for plugging of onshore wells; it cannot be used at sea. I would like to add here that this P&A unit is a Dutch product, made by WellGear from Westerbork, a stones's throw from our office in Assen. The development was done in close collaboration with Mammoet, Baker Hughes, and of course, the NAM expertise was used.

"At our location in Uiterburen the first Groningen wells have been decommissioned. At this moment, the decommissioning tower is in Twente. After completion, it will be transported to do decommissioning work in Drenthe, and it will return to the Groningen field at the end of the year to continue to decommission wells from the Groningen field. Ultimately, we have to safely decommission 300 wells there, a formidable task where we will build up a lot of experience with large scale decommissioning of wells."

Continue reading on www.nexstep.nl

Tomorrow

Dutch gas plays an important role in the energy transition. Because of the favourable CO_2 footprint, the economic value and the importance of maintaining the knowledge and skills of the subsurface in our country, the political and other North Sea stakeholders recognise that production from Dutch assets is to be preferred as long as hydrocarbon fuels remain a necessary part of the energy mix. While the industry provides safe, responsible, reliable and affordable energy to society today, at the same time it expands its activities and uses existing assets to contribute to maximising carbon reduction in the energy system of tomorrow.

Excerpt of interview with

Chris de Ruyter van Steveninck
CEO
ONE-Dyas

"The Netherlands will still need natural gas in the coming decades. Dutch natural gas is preferable to imported natural gas. In addition to security of supply and economic benefits for the Netherlands, our own natural gas also has a much lower CO_2 footprint. With the future-proof N05-A platform, we contribute to a further reduction of the CO_2 footprint. The N05-A platform will be the first Dutch offshore gas platform to run entirely on wind energy from the nearby Riffgat wind farm. Electrification using wind energy means a significant reduction in emissions. The emissions from the production platform will be nil, and for the entire project we are talking about a reduction of 85%. With this innovation, we are making a serious contribution to the energy transition, and we are committed to collaborate with sustainable forms of energy. The structural design takes into account possible alternative developments such as CCS and hydrogen. In this way, we can also make a valuable contribution to the energy transition at a later stage. ONE-Dyas is aware of the effects the project can have on the environment. We want to be a reliable partner and a good neighbour and ensure that our activities match the needs of the local community as closely as possible. All this in the safest and most responsible way. We consider future inlet connections and minimisation of the environmental impact. For example, we will apply the "single lifting" technique. In other words: set up and remove the entire platform in one go, so that there are fewer shipping activities on location."

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The day after tomorrow

When gas production stops, infrastructure becomes obsolete and will be decommissioned. Before the decommissioning decision is taken, it should be evaluated to see if it is suitable for future repurposing (e.g., transport and storage of CO_2, or production and transport of hydrogen etc.). If so, it should be considered to preserve the infrastructure. This requires a planned approach and transition legislation.

Excerpt of interview with

Lex de Groot
Managing Director
Neptune Energy

"If we can repurpose existing infrastructure to fast-forward low carbon energy, then that's simply the smart thing to do for us all. The Dutch North Sea has the potential to truly become a 'new energy hub' due to the existing extensive infrastructure that connects offshore with onshore. That will give opportunities for large scale green hydrogen production. The North Sea will be home to the world's first offshore green hydrogen pilot, PosHYdon, on a working production platform. Neptune Energy's Q13a-A platform will host the pilot, and it will be run together with all consortium partners. It's great that we will see true energy innovation right off the coast of Scheveningen. The lessons of PosHYdon will help to unlock the full potential of the North Sea for the large-scale production of green hydrogen. Integrating the wind and gas sectors offshore will not only create a second 'green energy' system next to wind electricity, but since it will be using existing infrastructure, it will be faster to develop and will save a lot of money for society.

"We announced a feasibility study on a large-scale offshore Carbon Capture and Storage (CCS) project in the Dutch North Sea with the potential to safely store 120 to 150 million tonnes of CO_2. The study will assess the feasibility of injecting between 5 and 8 million tonnes of CO_2 annually into the depleted gas fields around the Neptune-operated L10-A, L10-B and L10-E areas. If the project is developed it will be one of the largest CCS facilities in the Dutch North Sea."

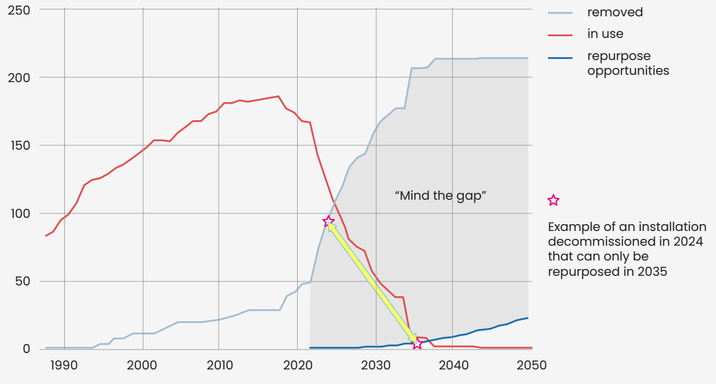
Continue reading on www.nexstep.nl

Mind the gap

As stated above, the existing infrastructure could play an important role in accelerating the energy transition. But there is one possible showstopper, and that is time.

In practice, the decommissioning of the infrastructure would be earlier than the demand for re-use or repurpose. Approximately half of the infrastructure offshore is scheduled to be decommissioned in the next decade. It is important to determine now which infrastructure can contribute to the energy transition and to ensure that this infrastructure is not decommissioned prematurely, preventing unnecessary future investments.

Number of offshore installations



Road to 30% update

Nexstep's innovation program is called the road to 30%. It consists of several roadmaps which contribute to Nexstep's aim to reduce costs by 30%. On this page we give you an update of the progress of the roadmaps. More information can be found in the Re-use and Decommissioning report 2021 at www.nexstep.nl.

Road to joint execution

In 2020, the proposed joint campaign for mud line suspension wells has been further developed. Firstly, we focused on the assurance of suitability of wells for the scope and secondly, on the development of all the required agreements. The Invitation to Tender was issued to the market early February. Currently, we are in the midst of the evaluation of the bids, and we expect that a contractor can be selected this summer to start with preparations this fall.

Road to rigless abandonment

In 2020, two field technology trials of Through Tubing Cementation have been jointly funded by Nexstep members and performed on land by NAM. Further jointly funded trials are scheduled for the summer of 2021.

Road to heavy lift standard

A study into alternative (marine) electrification for platforms in light house mode has started. The results are expected in July.

A pilot version of the contractor portal has been developed. The portal should be available for the Heavy Lift Vessel contractors during the second half of this year.

Additionally, the committee has started to identify decommissioning campaign opportunities.

Road to value protection pipelines

A Comparative Assessment (CA) has been developed to establish unequivocally which pipelines do not lead to hazardous situations and can be decommissioned in situ. Currently, discussions are being held with relevant ministries to determine whether the CA fulfils the requirements envisaged by article 103 of the Mining Decree and the preferred instrument for implementation.

Shared Learning

Learning of experiences of past decommissioning projects has become a standard procedure within Nexstep. Each year, several sessions are organised, and learnings are captured and stored in the database. At the moment, it consists of 320 learnings, which provide valuable lessons for future decommissioning projects. In June 2021, the first Peer Assist session took place. A group of peers from several operators gathered in workshops to review the planning and the technical approach of a particular decommissioning project.